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*The Operative Treatment of Hernia in
Children, with a Report of One Hun-
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BY

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THE OPERATIVE TREATMENT OF HERNIA IN CHILDREN,
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THREE CASES.

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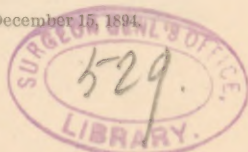
I BEGAN operating upon hernia in children in December, 1891, just three years ago. Since that time I have performed the operation for radical cure in 133 cases under fourteen years of age. An analysis of these cases, the methods employed, and the results obtained, may be of help in determining the question as to the justifiability and value of operative procedures.

We all know in a general way that, until the more recent methods of Macewen, Championnière, Bassini, and Halsted, the results were failures in so large a proportion of cases that all operations came to be looked upon with distrust by the profession at large. That distrust has by no means disappeared, even yet, and if we can show that it rests rather upon tradition than upon facts as they exist at present, it is our duty to do all in our power to dispel it.

Before taking up the subject of the operative treatment of hernia in children it is necessary to refer briefly to the results of mechanical treatment. Some surgeons high in authority have made the statement that all cases of hernia in children can be cured by trusses. Such statements as this, though undoubtedly made in good faith, show that their authors have not carefully followed up any very large number of cases. Our knowledge of the value and limitations of the mechanical treatment of hernia has been greatly increased by the recent publication of Macready's *Treatise on Ruptures*. It is by far the ablest and most scientific work on hernia yet published, and its conclusions are based on the records of the London Truss Society, the largest hernia clinic in the world.

As to the question of cure from mechanical treatment in children, Macready says, "We can only speak of probabilities; it may be said that many boys are cured, but then the prospect is more favorable for girls; that the younger the patient the more probable the cure; those with femoral hernia there is little chance of being able to dispense with a truss, and that after thirty years of age cure is not to be expected in either

¹ Read before the College of Physicians of Philadelphia, December 15, 1894.



sex or in either kind of hernia." The London Truss Society records show 33 per cent. of children ruptured go beyond the age of eleven years uncured, and the real number Macready considers much larger.

The records of the Hospital for Ruptured and Crippled bear out these statements. Having established this point, that certain cases in children do need other than mechanical treatment, it remains to determine whether or not these cases can be cured by operation, without subjecting them to any considerable risk.

In an earlier paper on the "Operative Treatment of Hernia in Children" (*Medical Record*, July 1, 1893) I stated as my belief "that operations for the cure of hernia should stand or fall according as they fulfilled two conditions of all operations (except emergency): first a mortality either *nil* or not greater than that associated with the condition prior to operation; second, a reasonable hope of success either as regards cure or relief." The older and less perfect methods failed to fulfil both of these conditions, but the same cannot be said of the methods that we employ to-day.

In no department of surgery is there need of wider experience and sounder judgment than in the management of hernia. The indications and contra-indications for operation should be thoroughly understood and carefully considered in every case. The indications for operation in children, as they appear to me, have already been outlined (*loc. cit.*) as follows:

1. Cases of adherent omentum (rare in children).
2. Cases complicated with reducible hydrocele.
3. Cases irreducible or strangulated.
4. Cases unable to obtain the care requisite to successful mechanical treatment.
5. Cases where mechanical treatment has been faithfully tried for a number of years without benefit.

The large majority of the cases that I have operated upon have belonged to the last two classes, although the other three have all been represented by a considerable number of cases.

METHODS EMPLOYED. Of the total 133 cases, 5 were femoral, 4 umbilical and ventral, and the remaining 124 inguinal. (10 females and 114 males.)

METHODS OF OPERATION AND TECHNIQUE. 1. Ligation of the sac and suture of the canal, without transplanting the cord, were the method employed in ten cases. The immediate and final results were as follows:

(a) *Catgut.* In two cases the buried sutures were of simple non-chromicised catgut: of these, one relapsed in four months, although a truss was worn after operation; the second case is well three years after operation.

(b) *Silk.* In one case silk was used for the buried sutures. This

case healed primarily, but soon after leaving the hospital two small sinuses appeared in the cicatrix and refused to heal until the silk suture had been extruded. Relapse occurred in three months in spite of the constant support of a truss.

(c) *Chromicised catgut*. This was used for buried sutures in four cases: of these, two are perfectly sound two years and nine months after operation; a third, two years and ten months; and a fourth, two years and eleven months.

(d) *Kangaroo-tendon* was employed in three cases: of these, one is well, without recurrence, two years and five months after operation; a second, eight months; and the third was not traced.

All of these ten cases healed primarily. Of the nine cases traced, seven are well without recurrence at present, and of these, six have gone nearly three years. The two relapses were due, one to the use of catgut, and the other to silk, the objections to which will be dealt with later.

2. Bassini's method, with the substitution of kangaroo-tendon for silk in the buried sutures, was employed in *one hundred and fourteen* cases. The tendon-sutures were actually employed in but one hundred and twelve cases, silk having been used in one case and chromicised catgut in one. The silk sutures were used in my first Bassini operation done in children. The wound suppurated very badly, the sutures sloughed out, and relapse followed, as a natural result, three months later.

The case in which chromicised catgut was used was a recent case, and the catgut was used because I had no tendon at hand. Primary union occurred, but three weeks after the operation two small sinuses appeared, and I do not expect them to close until the sutures are either thrown off or absorbed.

Having now eliminated these twelve cases in which there was more or less variation in technique, we have left one hundred and twelve cases not only operated upon by a single method, but in which the same technique was observed in every detail. It is only by an analysis of cases operated upon under similar conditions that conclusions of value can be drawn.

Although Bassini's elaborate paper, describing in detail his operation and reporting two hundred and sixty-two cases, was published four years ago (*Archiv f. klin. Chir.*, 1890), there have been so few accurate descriptions of the operation in English that the technique is not generally understood, and I may be pardoned for briefly outlining its essential features:

1. The *external incision* begins at a point nearly or quite on a level with the anterior superior spine, continues obliquely downward parallel with and about one-half an inch internal to Poupart's ligament, and ends at the centre of the external ring.

2. The incision is rapidly carried down until the aponeurosis of the

external oblique is freely exposed for a distance of two and one-half to three inches; a director is then passed through the external ring just beneath the aponeurosis, and the aponeurosis is divided well above, *e. g.*, one-half to one inch above the internal ring.

3. The cut edges of the aponeurosis are held up with forceps and dissected free from the underlying muscles as far as the edge of the rectus internally and externally until the shelving portion of Poupart's ligament has been clearly exposed.

4. The sac and cord are then isolated *en masse*, and this is best accomplished with the fingers and blunt-pointed curved scissors. If the peritoneal layer of the sac is first reached, the dissection is easy, rapid, and bloodless.

5. The cord and vessels of cord are now separated from the sac, and this, too, is best done with the fingers. The separation is carried high up within the internal ring, and the sac is ligated or sutured at the place where it merges into the general peritoneal cavity.

6. The cord is held up and the edges of the aponeurosis rolled back, while from three to five buried sutures are introduced beneath the cord. These are best introduced from within outward, and should include the internal oblique and transversalis muscles, the transversalis fascia (and sometimes the edge of the rectus) on the inner side, and the deep shelving portion of Poupart's ligament on the outer side. The lowermost suture should embrace the conjoined tendon.

7. The cord is now replaced and the cut aponeurosis is closed over it by means of a continuous suture extending as near the pubis as possible without causing undue constriction of the cord.

8. Closing the skin-wound with interrupted sutures without drainage completes the operation.

Although this may sound like a somewhat complicated operation, and in fact it has been objected to for this reason by many surgeons, in actual practice it is simple and can be quickly performed. I have done the entire operation in fifteen minutes, and in one day I performed five operations upon four subjects in two hours and ten minutes.

I have endeavored to follow the technique laid down by Bassini as carefully as possible with the single, and, as I believe, important modification of substituting kangaroo-tendon for silk in the buried sutures.

The character of the *suture-material* I believe to be one of the most important factors in the success of any operation for the radical cure of hernia, and I do not think sufficient credit has been accorded Dr. H. O. Marcy for having demonstrated the great value of kangaroo-tendon in such operations. The tendon has been employed for many years at St. George's Hospital, London, and almost exclusively in ligating large vessels.¹ Its non-irritating properties and the time required for absorp-

¹ Brit. Med. Journ., November 15, 1890, p. 1110.

tion—two to three months—have been experimentally demonstrated by Ballance and Edmunds, and I believe that an analysis of the cases presented to-night alone would be sufficient to establish its superiority to other suture-material for hernia operations. During the past three and a half years I have used kangaroo-tendon for all buried sutures in one hundred and eighty hernia operations; of these, one hundred and seventy-four healed by primary union, and the only relapse that has occurred was in a case of large congenital hernia of the umbilical cord in a child aged three years.

Silk, silkworm-gut, and silver wire have been in turn much lauded by noted surgeons as ideal suture-material for hernia operations. Their profound belief in asepsis as the embodiment of all the requisites of surgery has led them to think that the human body will rebel against nothing but germs: no matter how aseptic silk or silver wire may be, they are foreign bodies, and when placed near the surface of the body, particularly in a locality subjected to such constant motion as the inguinal canal, there is an effort on the part of Nature to rid herself of them. I am not dilating upon theoretical objections. I have seen sluggish discharging sinuses at the site of the incision many months after the operation for inguinal hernia where silk had been used, and in one case the patient remained practically an invalid nearly a year on account of this condition. Such instances are not rare, and, what is more, the ones I have observed occurred in the hands of men whose aseptic technique is as nearly perfect as any with which I am familiar.

Unless there are some advantages to be gained by using a non-absorbable suture, I see no reason why we should incur the risks of such results as I have mentioned.

In view of the many loose and contradictory statements as to the value of operations for the cure of hernia, there is nothing that will conduce more to settling this question upon scientific lines than to establish some definite period of time beyond which the hernia may be reasonably considered cured. Various periods have been given, but all of these have been based on impressions of surgeons derived from a limited number of cases. The limits more frequently given are three years or two years.

To ascertain whether these limits were in harmony with the facts, I have made a careful analysis of 250 cases of relapsed hernia observed and carefully recorded at the Hospital for Ruptured and Crippled during the past five years. These cases represent nearly all the operations in vogue during this time, and the large majority were operated upon by leading surgeons of New York and Brooklyn. One hundred and seventy-one operations were for non-strangulated hernia, and seventy-nine for strangulated hernia.

These cases I have analyzed with reference to the time when relapse

occurred, with the following results: Of the non-strangulated, 120 cases, or 70 per cent., relapsed one to six months; 27 cases, or 15.8 per cent., six to twelve months; 84.8 per cent. first year; 14.2 per cent. after first year; 5.8 per cent. one to two years; 8.4 per cent. two years.

Strangulated, 79 cases, 64.5 per cent. relapsed one to six months; 20 per cent., six to twelve months; 84.8 per cent., first year; 5.4 per cent., one to two years; 9.8 per cent., one to two years.

Some surgeons use ordinary non-chromicised catgut for the buried sutures, and even go so far as to state that the sooner the sutures are absorbed the better. As I have pointed out in a previous paper, the tissues to be united in closing the hernial canal are largely tendinous in structure, and the elaborate experiments of Busse¹ show that perfect tendinous union does not occur under ten weeks, or just about the period required for absorption in kangaroo-tendons. No better practical demonstration of the failure of catgut to meet the requirements of a suture in hernia operations could be had than the results in 19 cases of hernia in children, operated upon at the Hospital for Ruptured and Crippled in 1889-90, in which catgut was used. Of these 19 cases operated upon by suture of canal in part, and in part suture of external ring, 10 cases relapsed; 7 of these relapses occurred within three months after operation; 5 other cases were not traced, and only 2 were known to be sound three years after operation.

Having described the methods employed, let us analyze the cases now in detail.

Of the 112 cases operated upon by the Bassini method with kangaroo-tendon for the buried suture, primary union occurred in 109, or 97 per cent. In only one case was the suppuration more than slight and superficial, and that was only down to the aponeurosis. This case is now perfectly sound, one and one-half years after operation.

The percentage of cases followed by immediate healing of wound without suppuration obtained by the leading operators is stated by Sir William MacCormac² as follows: MacCormac, 80 per cent.; Kocher, 89 per cent.; Billroth, 39 per cent.; Schede, 35 per cent.; Macewen, 86.7 per cent.; Ball, 81.8 per cent.; McBurney, 81.6 per cent.; Halsted, 82 per cent.; Kuster, 79 per cent.

Final results. All but two of the cases of Bassini have been traced. Of these, 4 have gone without truss and without relapse two and one-half to three years; 10, two to two and one-half years; 18, one and one-half to two years; 17, one to one and one-half years; 20, six months to one year; 45 less than six months; 49 cases have gone more than one year.

Mortality. There has been but one death, caused by double pneumonia,

¹ Deut. Zeit. f. Chir., 1891-92, xxxi.

² Bradshaw Lecture, 1893.

in a child of five years. It was undoubtedly due to the effect of the ether, etc. The child had had measles five weeks before, and took the anæsthesia very badly. An autopsy showed double pneumonia, with no abdominal complications and no trouble in the wound. Death occurred on the fifth day.

Femoral hernia; five cases. The method employed was high ligation of the sac and suture of the crural opening with buried kangaroo-tendon. No relapse has occurred, and all the cases have been traced: 1 is well two years and eight months after operation; 1 is well twenty months after operation; 1 is well eighteen months after operation; the other two are recent cases.

Umbilical and ventral; four cases. These have all been operated upon during the past year, and are sound with one exception—a congenital hernia of the cord in a girl of three years. A slight recurrence took place in this case within three weeks after the operation, due to a severe bronchitis.

The method employed was excision of the umbilicus and sac, suture in three layers, with kangaroo-tendon for the buried suture.

Strangulated hernia. This condition has always been regarded by surgeons as too rare to be considered, many of the most noted surgeons having never seen a case.

Tariel, of Paris, has recently contributed a valuable paper on this subject, and has collected all of the cases thus far reported in surgical literature. He was able to find 128 cases under two years of age, with 74 recoveries.

I have operated upon 6 cases: 1 aged eight weeks, 1 aged eight months, 1 aged twelve months, 1 aged seven and one-half months, 1 aged five months, and 1 aged twenty-three months. All except one recovered, and that was practically moribund at the time of operation. Simple herniotomy was performed without attempting radical cure.

Cæcal hernia. In eight cases the cæcum or appendix vermiformis formed the contents of the sac. In two cases the appendix alone was found, and in both these the tip of the appendix was firmly adherent to the bottom of the sac. The adhesions were separated and the appendix returned to the abdominal cavity. These two cases, as well as a considerable number where the mesenteric attachment of the bowel extends low down into the sac, emphasize the importance of opening the sac in *all cases* before ligation or suture.

Dr. W. L. Rodman, of Louisville, has recently reported a case where a sac which, as far as could be detected by careful examination, appeared perfectly empty, on ligation showed a severed appendix in the lower end.

In two of the strangulated cases the appendix and cæcum together were found. In one case the color of the appendix was so dark that I thought it more prudent to remove it. Recovery followed.

The other case was the child eight weeks old, nearly moribund at time of operation. Simple relief of strangulation was all that was warranted, and death occurred two days later. In a non-strangulated case of appendix hernia, the appendix if adherent can be readily freed and reduced; and I do not believe it to be the best surgery to attempt removal. I cannot but believe it adds something to the danger of the operation; and unless the success of the operation can be shown to be materially dependent upon its removal, I do not think it indicated.

Dressings and after-treatment. In all of the cases the dressings were moist iodoform and bichloride gauze, held firmly in place by rubber-plaster, over which cotton and a muslin-spica were applied. The scrotum was always left exposed. Fixation was secured by means of a plaster-of-Paris spica extending from the edge of the ribs to the ankle. This was kept on until the first dressing, or about the eighth day. The skin-sutures are entirely of fine catgut, which is usually found to have been entirely absorbed by the first dressing. None of the cases, with the exception of two or three of the early cases operated upon by suture of the canal with catgut, have worn trusses since the operation, and I do not believe a truss should be advised.

Of the 112 cases operated upon by the Bassini method, with kangaroo-tendon for the buried sutures, not a single relapse has occurred and not a single case has worn a truss.

The following table will give the more important points of the cases in detail:

No.	Age	Sex.	Nature of hernia and duration.	Operation.	Operator.	Primary result.	Final result.
1	8	M.	Right inguinal, congenital, complicated with hydrocele of cord.	Dec. 12, 1891	Czerny. Catgut-ligature; no drain.	Primary union.	Relapse 4 months after oper'n.
2	14	M.	Right inguinal, very large; 3 years' duration.	Dec. 28, 1891	Bassini. Silk for buried suture; no drain.	Very profuse suppuration and sloughing of tissues.	Relapse in 4 months.
3	4	M.	Left inguinal, congenital.	Jan. 25, 1892	Czerny. Catgut-sutures; no drain.	Primary union.	Sound Dec. 1894
4	9	M.	Right inguinal; 4 years' duration.	Jan. 1892	Czerny. Silk-sutures; no drain.	Prim. union; sinus form'd after leaving hospital; sutures came out.	Relapse in 3 months.
5	13	M.	Left inguinal; 2 years.	Mar. 15, 1892	Czerny. Chromicised catgut; no drain.	Primary union.	Perfect; sound Oct. 20, 1894; no truss.
6	10	M.	Left inguinal, congenital.	Feb. 15, 1892	Czerny. Chromicised catgut; no drain.	Primary union.	Perfect Oct. 1, 1894
7	7	M.	Right inguinal.	Mar. 30, 1892	Bassini. Kangaroo-tendon for buried sutures; catgut for skin.	Primary union.	Firm Feb. 1894
8-9	7	M.	Double inguinal; very large.	April 8, 1892	High ligation of sac and closure of canal with buried sutures of chromicised catgut; no drain.	Primary union, both sides.	Solid Oct. 1894
10-11	7	M.	Right femoral, left inguinal; left 3 years, right 6 months.	Apr. 28, 1892	High ligation of sac; suture canal with kangaroo-tendon; purse-string suture femoral canal.	Primary union, both sides.	Perfect Oct. 1894
12	13	M.	Right inguinal; 11 years' duration; truss 7 yrs.	May 5, 1892	Bassini. Kangaroo-tendon for buried suture; no drainage.	Primary union.	Perfect Oct. 1894
13	6 1/2	M.	Right inguinal, size of egg; one suture adherent.	June 6, 1894	Bassini. Kangaroo-tendon for buried suture; catgut for skin; no drain; omentum ligated.	Primary union.	Perfect Oct. 1894
14	4 1/2	M.	Right inguinal, congenital.	June, 1892	Bassini. Kangaroo-tendon for buried suture; catgut for skin; no drain; omentum ligated.	Primary union.	Perfect Oct. 3, 1894
15	8 months	M.	Right inguinal, 1 week; strangulated, 24 hours.	July 9, 1892	Canal closed with buried kangaroo-sutures; cord not transplanted.	Primary union; one week in hospital.	Oct. 3, 1894 perfectly sound; no truss worn.
16	14	M.	Left inguinal, congenital; size of egg.	July 26, 1892	Bassini's method: lower part of sac sutured over testis; kangaroo-tendon for buried suture.	Primary union; no truss.	Perfect Dec. 1894; no truss.
17	10	M.	Right inguinal, very large, congenital; complicated with hydrocele; reducible.	July 26, 1892	Bassini. Kangaroo-tendon for buried suture; no drain.	Primary union.	Sound Oct. 1894; no truss.
18	44	M.	Left inguinal; not held by truss; 1 year's duration.	Aug. 23, 1892	Bassini. Kangaroo-tendon for buried suture.	Primary union; two weeks in bed.	Sep. 29, 1894, perfect; no truss.
19	12	M.	Left inguinal, congenital.	Aug. 23, 1892	Bassini. Kangaroo-tendon for buried suture.	Primary union 2 1/2 weeks	Feb. 24, 1894, sound; no truss.
20	4	M.	Right inguinal, caecal, congenital.	Sept. 13, 1892	Canal sutured; cord not transplanted, kangaroo-tendon for suture; no drain.	Primary union.	Not traced.
21	11	M.	Right inguinal; several years; not held by truss.	Sept. 9, 1892	Bassini. Kangaroo-tendon; no drain.	Primary union.	Oct. 1, 1894, perfect; no truss.
22	—	M.	Right inguinal.	Oct. 5, 1892	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Oct. 1, 1894

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No.	Age	Sex.	Nature of hernia and duration.	Operation.	Operator.	Primary result.	Final result.
23	14	M.	Left inguinal, congenital; relapse after supposed cure from truss.	Oct. 29, 1892	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 1894; no truss.
24	12	M.	Left inguinal, very large, congenital.	Nov. 1, 1892	Bassini. Kangaroo-tendon; no drain.	Primary union.	Well Feb. 1894, firm; no truss.
25	4	M.	Right inguinal, congenital.	Nov. 4, 1892	Bassini. Kangaroo-tendon; no drain.	Primary union.	Well Feb. 1894; no truss.
26	11	M.	Right inguinal.	Nov. 29, 1892	Bassini. Kangaroo-tendon; no drain.	Primary union.	Well Oct. 12, 1894
27	4	M.	Right inguinal; cæcal; (spine disease).	Jan. 6, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Sound Dec. 1894
28	4	M.	Case No. 27; left side.	Jan. 6, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Sound Dec. 1894
29	6	M.	Left inguinal, complicated with reducible hydrocele.	Jan. 20, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Sept. 1894
30	9	M.	Left inguinal; 4 years; no improvement with truss.	Jan. 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Nov. 17, 1894
31	14	M.	Left inguinal.	Feb. 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 15, 1894
32	7	M.	Left inguinal.	Feb. 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Feb. 1894
33	14	M.	Right inguinal, complicated with undescended testis.	Mar. 10, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Sept. 20, 1894
34	10	F.	Right inguinal.	Mar. 10, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 1894
35	10	M.	Right inguinal; cæcal; appendix adherent to sac.	Mar. 24, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 1894
36	14	F.	Right femoral.	April 4, 1893	Purse-string suture, kangaroo-tendon.	Primary union.	Perfect Dec. 10, 1894
37-38	12	M.	Double inguinal; recurrent few months after Czerny operation, done February, 1890.	Apr. 11, 1893	Bassini.	Primary union.	Perfect Oct. 6, 1894
39	13	M.	Right inguinal, complicated with undescended testis.	Feb. 1893	Bassini.	Primary union.	Perfect Feb. 1894
40	5	M.	Right inguinal.	April 4, 1893	Bassini.	Primary union.	Perfect Feb. 27, 1894
41	7½	M.	Strangulated; cæcal and appendix.	June 1, 1893	Appendix removed.	Primary union.	Perfect; died four weeks later of another trouble.
42	11	F.	Right femoral.	June 6, 1893	Purse-string suture.	Primary union.	Perfect Oct. 20, 1894
43	9	M.	Right inguinal; cæcal.	June 13, 1893	Bassini.	Primary union.	Perfect Sept. 28, 1894
44	11	M.	Right inguinal.	June 18, 1893	Bassini.	Primary union.	Perfect Oct. 20, 1894
45	11	M.	Right inguinal.	July 18, 1893	Bassini.	Very profuse suppuration to deep fascia.	Perfect Nov. 2, 1894
46	8	M.	Right inguinal, congenital, with undescended testis.	Jan. 18, 1893	Bassini. Kangaroo-tendon for testis anchored to wire from outside scrotum; testis atrophied; no drain.	Primary union.	Perfect Oct. 1894; testis atrophied.
47	9	M.	Right inguinal; 7 years' duration.	Aug. 18, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union; 2½ weeks in bed.	Perfect Feb. 27, 1894
48	11	M.	Right inguinal, congenital; size of goose-egg.	Aug. 1893	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Oct. 11, 1893; not traced.
49	8	F.	Umbilical, congenital.	Aug. 29, 1893	Omphalectomy suture; 3 large kangaroo-tendons for buried suture.	Primary union.	
50	11	M.	Right inguinal, congenital; truss 11 years.	Aug. 11, 1893	Bassini. Kangaroo-tendon; no drain.	Primary union, three weeks.	Well Dec. 1894
51	12	F.	Right femoral; 7 years' duration; truss entire time.	Sept. 25, 1893	High ligation of sac; purse-string suture of canal; kang.-tendon.	Primary union, three weeks.	Well Nov. 1893

No.	Age	Sex.	Nature of hernia and duration.	Operation.	Operator.	Primary result.	Final result.
52	5	M.	Right inguinal, congenital.	Oct. 10, 1893	Bassini. Kangaroo-tendon.	Primary union, 2½ weeks.	Well Nov. 1, 1894
53	12	M.	Right inguinal; 6 years' duration.	Oct. 10, 1893	Bassini. Kangaroo-tendon.	Primary union.	Well Oct. 6, 1894
54	6	M.	Double inguinal, congenital, large.	Oct. 17, 1893	Bassini. Kangaroo-tendon.	Primary union.	Well Sept. 25, 1894
55	10	M.	Right inguinal; duration 3 years.	Nov. 14, 1893	Bassini. Kangaroo-tendon.	Primary union.	Well Sept. 29, 1894
56	7	M.	Right inguinal, size of goose-egg; since infancy.	Nov. 14, 1893	Bassini. Kangaroo-tendon.	Primary union.	Well Oct. 1, 1894
58	1	M.	Right inguinal; caecal.	Nov. 21, 1893	Bassini. Kangaroo-tendon.	Wound healed primarily; orchitis which suppurated second week.	Well April 26, 1894
59	14	F.	Double inguinal.	Nov. 28, 1893	Bassini. Kangaroo-tendon.	Very slight suppuraton on suture-hole.	Well Nov. 3, 1894
61	8½	M.	Double inguinal, congenital; size of fist both sides.	Dec. 1, 19, 1893	Bassini. Kangaroo-tendon.	Primary union.	Well March 6, 1894
63-64	6	M.	Double inguinal, with Pott's disease.	Left, Dec. 22, 1893; right, Feb. 6, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Feb. 5, 1894
65	7½	M.	Right inguinal, since 5 weeks old.	Dec. 29, 1893	Bassini. Kangaroo-tendon.	Primary union.	Perfect Nov. 3, 1894
66	5	M.	Left inguinal, with Pott's disease.	Jan. 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Nov. 1894
67	3¾	M.	Left inguinal, complicated with Pott's disease.	Jan. 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Died few weeks later tubercular meningitis.
68-69	6	M.	Double inguinal, with Pott's disease.	Jan. 30, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Sept. 1894
70	6	M.	Right inguinal, congenital.	Jan. 30, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Oct. 1, 1894
71	7	M.	Left inguinal; hernia in infancy cured with truss; relapsed 2 years ago.	Feb. 13, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Sept. 29, 1894
72	4	M.	Left inguinal, congenital; size large orange.	Feb. 13, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Apr. 6, 1894
73-74	2½	M.	Double inguinal, congenital; truss since 6 weeks old; very large; uncomfortable.	Right Feb. 16; left, Sept. 27, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1, 1894
75	6	M.	Right inguinal.	Feb. 1894	Bassini. Kangaroo-tendon.	Primary union.	Died on 8th day; double pneumonia confirmed by autopsy.
76	10	M.	Left inguinal; very large.	Mar. 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1, 1894
77	9	M.	Right inguinal, scrotal; since infancy.	Apr. 10, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Oct. 6, 1894
78	12	F.	Double inguinal; operation right side; congenital.	Apr. 20, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1893
79	8	M.	Right inguinal; duration 6 years; hernia vermiform appendix.	Apr. 20, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 15, 1894
80	6	M.	Left inguinal; 3 years truss treatment.	Apr. 19, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Sept. 1894
81	14	M.	Left inguinal; since infancy.	May 1, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 1894
82	4	M.	Right inguinal; caecal; operation for recurrence; size goose-egg; irreducible, adherent.	May 15, 1894	Canal sutured with kangaroo-tendons; gauze-drain.	Primary union except at site of drain.	Well Dec. 11, 1894
83	11	M.	Right inguinal; 8 years.	May 8, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Aug. 21, 1894

12 COLEY: OPERATIVE TREATMENT OF HERNIA.

No.	Age	Sex.	Nature of hernia and duration.	Operation.	Operator.	Primary result.	Final result.
84	3	F.	Hernia of umbilical cord, congenital; size goose-egg.	Nov. 1893	Excision of umbilicus and sac; suture fascia; kangaroo-tendon; catgut for skin.	Primary union.	Slight relapse few weeks after operation.
85	13	F.	Umbilical; since infancy.	June 12, 1894	Excision of umbilicus; sutures kangaroo-tendon buried.	Primary union.	Perfect Oct. 17, 1894
86	9	M.	Left inguinal, congenital; undescended testis.	June 12, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Oct. 5, 1894
87	8	M.	Right inguinal; since infancy; truss 3 years.	June 23, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Nov. 12, 1894
88	4	F.	Ventral; size of English walnut, just above navel.	June 19, 1894	Suture fascia with kangaroo-tendon.	Primary union.	Perfect Oct. 1894
89	7 1/2	M.	Right inguinal.	May 18, 1894	Bassini.	Primary union.	Perfect July, 1894
90	4	F.	Right inguinal; 2 1/2 yrs.	July 6, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Oct. 4, 1894
91	7	M.	Right inguinal, complicated with reducible hydrocele.	July 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Sept. 1894
92	6	M.	Right inguinal, since 3 months old.	July 10, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect
93	10	M.	Left inguinal; 4 years.	July 10, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Nov. 3, 1894
94	7	M.	Right inguinal; since 6 weeks old.	July 20, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Aug. 24, 1894
95	9	M.	Right inguinal; truss 2 years.	July 20, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect
96	12	M.	Right inguinal, congenital.	July 27, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Oct. 4, 1894
97	10	M.	Right inguinal.	Aug. 3, 1894	Bassini. Kangaroo-tendon.	Primary union.	Sound Dec. 15, 1894
98-99	9	M.	Double inguinal, with double reducible hydrocele.	Aug. 7, 1894	Double Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Nov. 13, 1894
100	7	M.	Right inguinal; vermiform appendix, adherent, reducible.	Aug. 14, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Nov. 24, 1894
101	14	M.	Left inguinal; since infancy; relapsed after truss "cure."	Aug. 14, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Sept. 24, 1894
102	9	M.	Right inguinal, congenital; truss 7 years.	Aug. 21, 1894	Bassini. Kangaroo-tendon; no drain.	Slight supuration tenth day.	Perfect Oct. 11, 1894
103	4	M.	Right inguinal; since infancy	Aug. 28, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Oct. 4, 1894
104	10	M.	Right inguinal; 7 1/2 yrs.; truss 6 yrs.	Sept. 5, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Oct. 3, 1894
105	9	F.	Right inguinal; 6 years.	Sept. 27, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Nov. 1894
106	4	F.	Right inguinal.	Oct. 4, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Nov. 1894
107	11	F.	Right femoral; 6 years; size of egg.	Oct. 5, 1894	Excision of sac; suture canal; kangaroo-tendon; no drainage.	Primary union.	Perfect Dec. 1894
108	5	M.	Right inguinal; 3 years.	Oct. 1, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1894
109	6	M.	Right inguinal, congenital; truss 4 years.	Oct. 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1894
110	6	M.	Left inguinal; 3 years.	Oct. 1, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1894
111	3 1/2	M.	Right inguinal, with large reducible hydrocele.	Oct. 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1894
112	9	F.	Right inguinal.	Oct. 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1894
113	6 1/2	M.	Right inguinal; 4 1/2 yrs.	Oct. 9, 1894	Bassini. Kangaroo-tendon.	Primary union.	Perfect Dec. 1894
114-115	11	M.	Double inguinal.	Oct. 25, 1894	Double Bassini. Kangaroo-tendon right side; chromicised catgut left.	Fourth week small sinus at site of suture where ch. catgut used.	Perfect Dec. 1894
116	13	M.	Right inguinal; 6 years.	Oct. 26, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 1894
117	12	M.	Right inguinal; since infancy.	Oct. 26, 1894	Bassini. Kangaroo-tendon; no drain.	Primary union.	Perfect Dec. 1894

No.	Age	Sex.	Nature of hernia and duration.	Operation.	Operator.	Primary result.	Final result.
118	11	M.	Left inguinal; 3 years.	Oct. 26, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
119-120	10½	M.	Double inguinal; 3 yrs; treated 3 years with truss.	Oct. 26, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
121	5	M.	Strangulated inguinal right; strangulated 48 hours.	Oct. 22, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
122	6	M.	Right inguinal.	Nov. 1, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
123	4	M.	Right inguinal.	Nov. 8, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
124	13	M.	Right inguinal.	Nov. 2, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
125	7	M.	Double inguinal; operation left side; 7 years' truss treatment.	Nov. 16, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
126	7	M.	Right inguinal.	Nov. 15, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
127-128	6	M.	Double inguinal; 5 years	Nov. 30, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
129	7	M.	Right inguinal; size of orange; since infancy.	Nov. 23, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
130	7	F.	Right inguinal; 2½ yrs.	Dec. 1, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
131	23	M.	Strangulated, right inguinal	Dec. 7, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
132-133	11	M.	Double inguinal; duration 4½ years.	Dec. 7, 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect Dec. 1894
134	12	M.	Left inguinal strangulated.	Feb. 1894	Bassini.	Kangaroo-tendon; no drain.	Primary union. Perfect July, 1894

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